

morro bay
volunteer monitoring

Morro Bay Volunteer Monitoring Program

Water Quality Update

Spring 2005

Background

The Morro Bay Volunteer Monitoring Program (VMP) has been monitoring water quality on local creeks throughout the watershed since the summer of 2002.

Volunteers venture out to 15 creek sites on a monthly basis to collect data for the following parameters: dissolved oxygen (DO), pH, temperature, conductivity, turbidity, flow, nitrates and orthophosphates. Ideally, all sites would be monitored on the same day, but due to limitations of equipment and manpower, monitoring at all the sites takes place within the same week.

The following analysis assessed VMP data collected between June 2002 and April 2005. Note that all sites are not monitored each month, as some creeks dry up in the summer.

How are our data used?

The purpose of VMP data is to track long-term trends in the Morro Bay watershed. The Morro Bay National Estuary Program (MBNEP) conservation and management plan calls for long-term watershed-wide monitoring as well as support of a volunteer monitoring program.

Additionally, VMP data are used by agencies, non-profits and others to help them target their own monitoring efforts. Volunteer-generated data will assist the Central Coast Regional Water Quality Control Board (CCRWQCB) in monitoring implementation of Total Maximum Daily Load (TMDL) regulations which identify the sources of pollutants, determine how much pollution can enter the waterbody without impacting the beneficial uses, and assign proportional responsibility for controlling the pollutants.

Volunteer Monitoring Program Water Quality Monitoring Sites

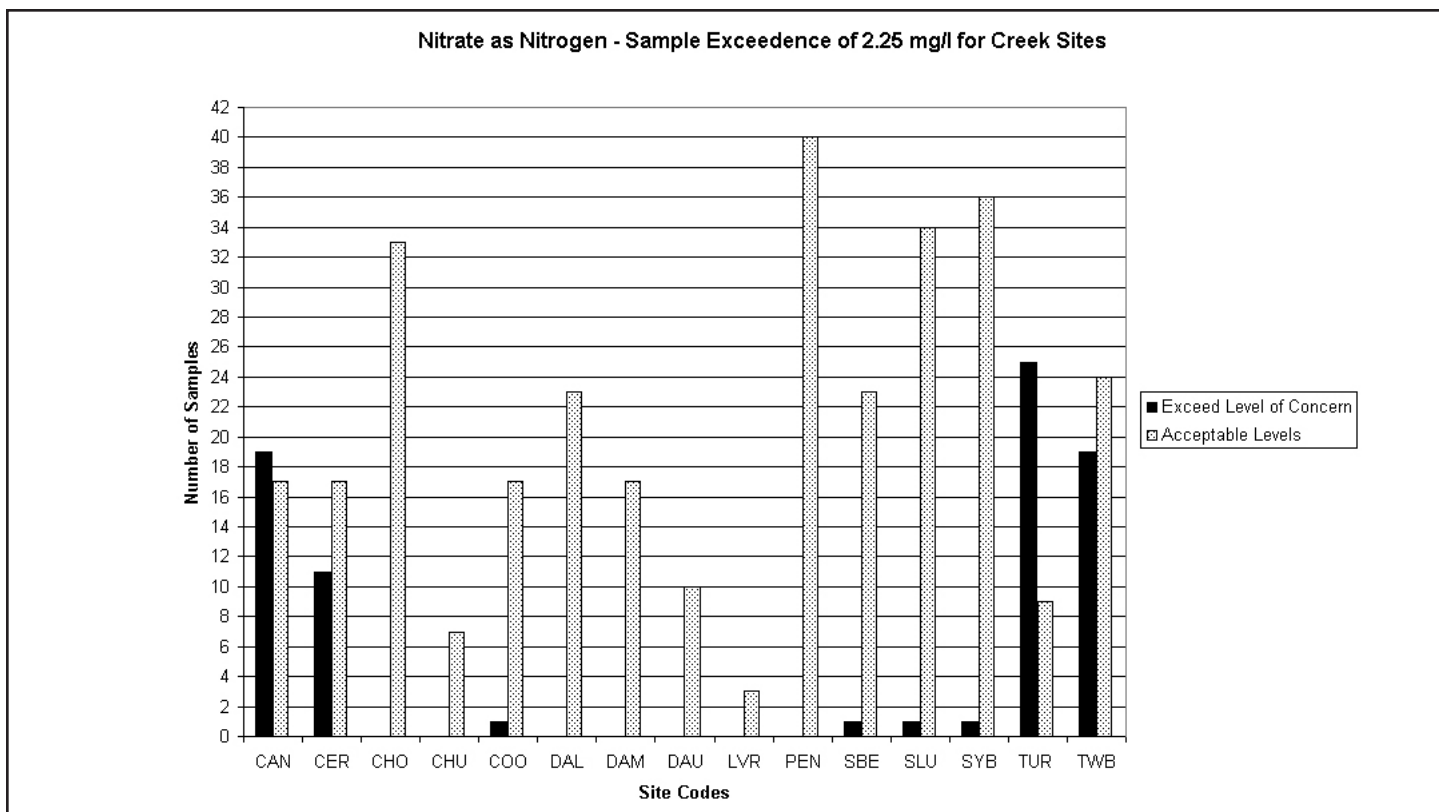
The monitoring sites are distributed throughout the watershed, with site placement focused at the lower reaches of the tributary creeks. Sites were also selected for ease of access and volunteer safety.

CHO, CAN, CER and TWB are monitoring sites along Chorro Creek. PEN, DAL, DAM, SLU, CHU, WAL and SBE are each tributaries to Chorro Creek. TUR, SYB and LVR are sites in the Los Osos Creek subwatershed.

Coon Creek (COO), which is outside of our watershed, was selected as a 'control' site to be monitored. It has similar geological and hydrological conditions as our watershed but is relatively unimpacted by human activities.



Nitrate Levels in the Morro Bay Watershed



Volunteers use test kits to measure the levels of nitrates in local creeks. While nutrients are naturally occurring and essential, excess nutrients can be harmful to creeks by stimulating excessive algal growth. Algal blooms result in fluctuating oxygen levels, oxygen depletion and, in extreme cases, fish kills.

The CCRWQCB has determined an informal attention level of concern for protection of aquatic life for nitrates as nitrogen of 2.25 mg/L. The standard for protection of human health is 10 mg/L.

The chart shows the average levels of nitrates as nitrogen and the range of readings. On Chorro Creek, CHO has relatively low levels (none of the 33 samples exceeded the attention level) while further downstream, CER (61% exceeded the standard), CAN (53% exceeded) and TWB (44% exceeded) have significantly higher levels. One potential source of the elevated nutrients is the California Mens Colony wastewater treatment plant below CHO that discharges treated effluent into Chorro Creek. Plant improvements, slated to be completed in

2006, are designed to remove much of the nutrients from the effluent before it is discharged to Chorro Creek.

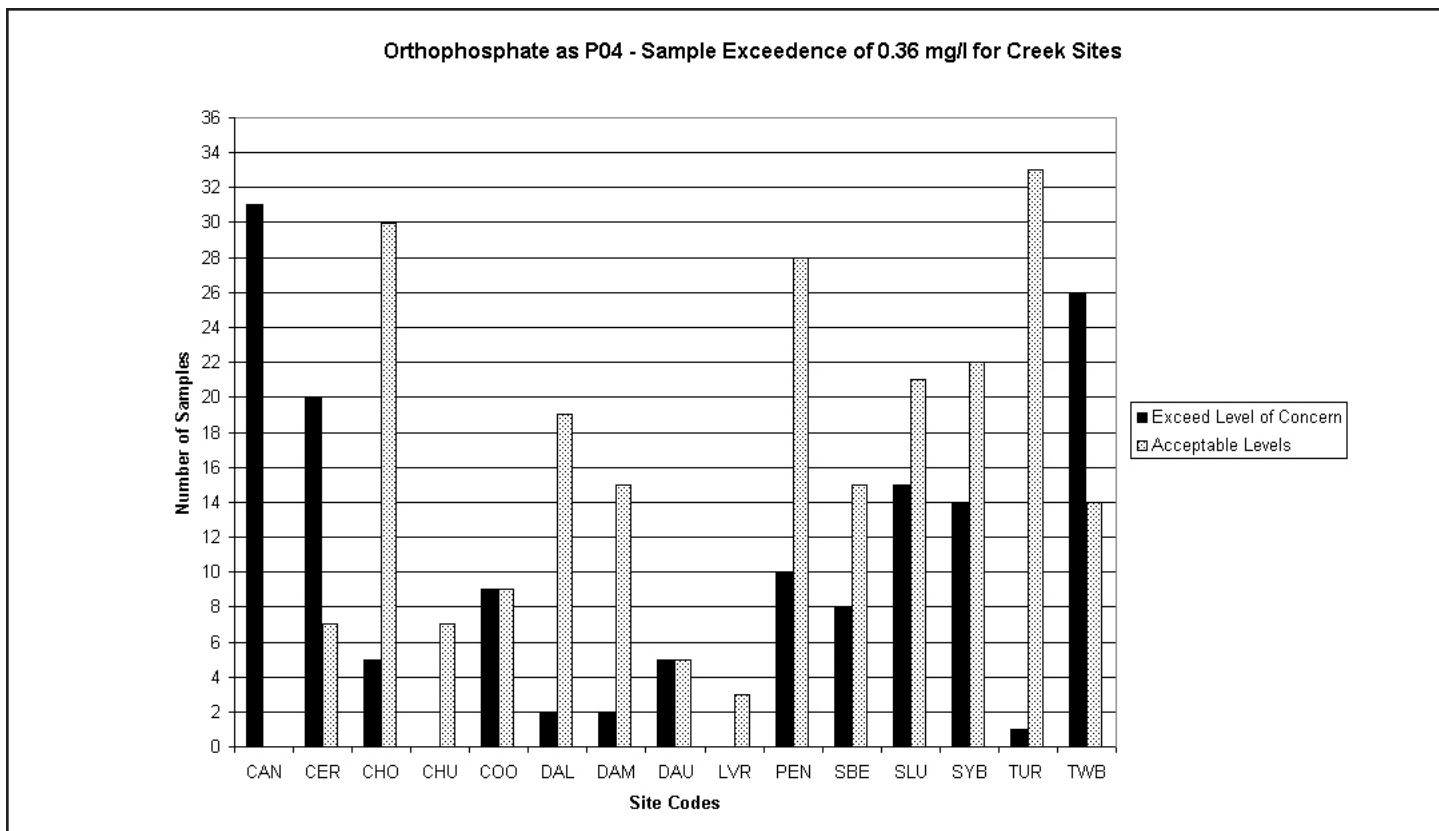
In the Los Osos subwatershed, we observed very high nutrient levels at TUR (74% of the samples exceeded the standard). This site is downstream from numerous agricultural operations, a potential source of these nutrients.

What is the level of concern?

The CCRWQCB is responsible for protecting the waters of this region, which stretches from Santa Cruz to Santa Barbara. Each body of water has designated beneficial uses such as drinking water, agricultural, fish habitat or recreation. For each waterbody for each designated use, the RWQCB designates a regulatory standard for each applicable pollutant.

For nitrates as nitrogen, the standard of 10 mg/L is to protect human health. Based on values in the literature, the CCRWQCB has set an information attention level of 2.25 mg/L for protection of aquatic life.

Orthophosphates in the Morro Bay Watershed



Orthophosphates

Volunteers use a test kit to measure orthophosphate as PO_4^{3-} levels. We measure for this form of phosphate because it is the more 'bioavailable' form. The CCRWQCB has set an informal attention level of 0.37 mg/L for orthophosphate as PO_4^{3-} for the protection of aquatic life. There is no formal standard in the state's regulations for this parameter.

Our monthly data showed average levels above the attention level at CAN (86% of the samples exceeded the standard), CER (74% exceeded), SLU (42% exceeded) and TWB (65% exceeded). In comparison, CHO, the most upstream Chorro site, had an average level of 0.24 mg/L with 14% of its samples exceeding the attention level. The reason for the elevated readings at CAN, CER and TWB may be treated effluent from the wastewater treatment plant located between CHO and CER.

In the Los Osos subwatershed, we observed lower values than in the Chorro basin, which could be due to lower base flow and pooling at the monitoring sites.

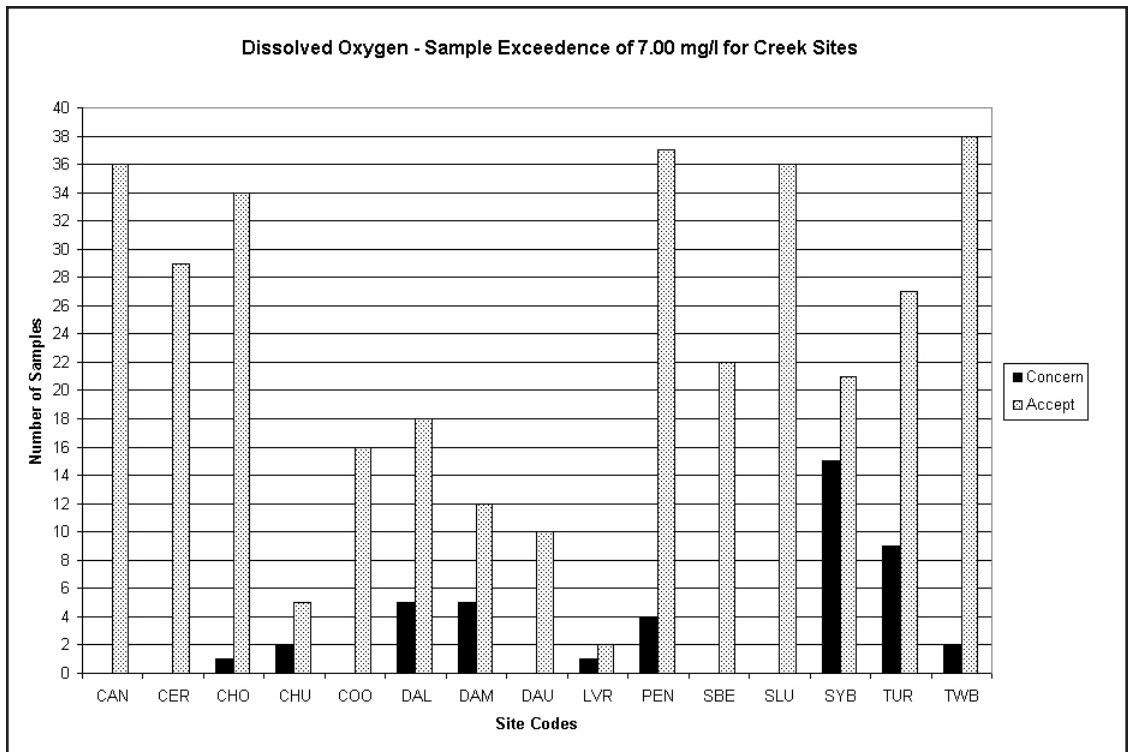
Interestingly, COO, which is intended to be a control site, had an average level of 0.50 mg/L and 50% of the samples exceeded the attention level. There is not a similar trend with nitrates - those levels are well below the attention level.

Why the high levels at our control site?

In the three years that Coon Creek has been monitored, we have been puzzled as to why half of the orthophosphate readings exceeded the informal attention level. The answer may lie in the geology. A local geologist informed us that south of Coon Creek is the Monterey Formation, which contains units of pure phosphates formed long ago when the land was covered by water. A minor landslide could have exposed some of these formations, leading to the elevated orthophosphate levels that we are seeing in the waters of Coon Creek. We are currently considering a project to monitor further upstream and downstream to see if we detect the same elevated orthophosphate levels in different areas.

Dissolved Oxygen

The level of concern for protection of aquatic life is 7 mg/L. Average DO readings fell below this level at CHU (50% of the readings) and SYB (48% of the time), and came close to that level at DAL (45%), DAM (56%), TUR (17%) and WAL (25%). WAL, CHU and TUR are fairly stagnant, which could contribute to the low DO levels. Low flow levels, particularly in the dry season, result in warm water with depleted oxygen levels. SYB is tidally-influenced and these levels are possibly indicative of a bay-related phenomenon rather than what's going on in the creeks. DAL and DAM, however, are only



monitored when they are flowing and never in stagnant areas. A TMDL regulation for dissolved oxygen at Dairy Creek was just approved by the Regional Board and has been sent up to the state board for approval.

VMP Water Quality Monitoring Updates

We are seeking volunteers for water quality monitoring this summer. Volunteers are sent out in teams of two each month to creeks in the Morro Bay watershed. Data is collected using a series of test kits and meters. Each trip requires approximately 1.5 hours, including travel time. Please contact VMP staff if you are interested in participating.

Many thanks to the volunteers who give their time to help collect this data set. Without their efforts, this valuable information about our watershed would not exist to assist agencies, non-profits, landowners and others in targeting their own efforts.

Thank You, Volunteers!

We'd like to recognize the many volunteers who have given their time during 2005.

Sarah Bailly
 Diane Block
 Cecillia Boudreau
 Matt Copeland
 Bob Croyle
 Jim DaRoss
 Rich Dennis
 Pete Diaz
 Tim Dodson
 Callie Ford
 Amber Greening
 Aaron Hope
 Stephen Huang
 Mike Lacey
 Mike Lindley
 Katie Lockhart
 Michelle Luna
 Barbara Orchard

Kristy Pannke
 Michelle Parker
 Jenny Reeves
 B.K. Richard
 Jonathan Roberts
 Danny Silva
 Megan Snyder
 Jody Tarvin
 Eric Thorsell
 Shawna Von Stockausen
 Shirley Stoddard
 Jessica Ward
 Lauren Wild
 Theresa Woo
 George Wright
 Megan Wright
 Kelly Young